

REMARKS

Claims 1-16, 18-27, 52 and 53 are pending in the application, claims 17 and 28-51 being canceled and claims 52 and 53 being newly added herein. Claims 1, 52 and 53 are the only independent claims.

Restriction Requirement

Claims 1-51 were made subject to a Restriction Requirement according to which the Examiner divided the claims into three groups. Applicants previously elected claims 1-27 (Group I) for continued prosecution in the present application. The Examiner has now made the Restriction Requirement final. Applicants accordingly cancel non-elected claims 28-51 herein without prejudice to applicants' right to pursue those claims in a later filed divisional application.

Specification

The Examiner has objected to the specification as failing to provide proper antecedent basis for the ranges specified in claims 2-4, 6, 21, 23, 24, and 27.

In response to the Examiner's objection to the specification, applicants have amended the specification herein to add antecedent support.

Claims Objections

Claim 26 stands objected to because the word "bead" should be "beads".

Claim 26 has been amended herein to correct this error.

Claims Rejections - 35 U.S.C. § 112

Claim 22 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner specifically maintains that the term "neighboring obstructive

features” has insufficient antecedent basis in the claim. Applicants assume that the Examiner meant to refer to claim 23 rather than to claim 22 in making this rejection.

In response to the rejection under 35 U.S.C. § 112, second paragraph, claim 23 has been amended to provide antecedent support for the recitation “neighboring obstructive features.”

Claims Rejections - 35 U.S.C. §§ 102 and 103

Claims 1, 2, 4-10, 12-15, 17, 22 and 25 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,637,469 to Wilding et al.

Claims 3 and 27 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Wilding et al.

Claim 11 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Wilding et al. in view of U.S. Patent No. 6,548,263 to Kapur et al.

Claims 16 and 23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Wilding et al. in view of U.S. Patent No. 6,319,469 to Mian et al.

Claims 18-21, 24 and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Wilding et al. in view of U.S. Patent No. 5,925,567 to Kraus et al.

Applicants have amended claim 1 herein to incorporate subject matter from claims 13 and 17 to provide clear protection for a preferred embodiment of the invention. However, applicants respectfully maintain that claim 1 and selected dependent claims set forth subject matter that is patentable over the cited prior art. Accordingly, applicants have added independent claim 52 that is identical to original independent claim 1, to provide applicants with an opportunity to discuss the features of claim 1.

Amended Claim 1 As set forth in amended claim 1, a sensing device comprises a vessel and a plurality of sensor beads located within the vessel to form interstitial spaces

therethrough, the plurality of sensor beads comprising at least two different types of beads, each of the types of beads being made of a material different from the material of any other of the types of beads. The sensing device further comprises a plurality of biomolecules bound to at least a portion of the plurality of beads, each of the biomolecules having a fluorescent tag, the plurality of biomolecules comprising at least two different kinds of biomolecules, each of the different kinds of biomolecules being bound to a respective type of the at least two different types of sensor beads.

Applicants respectfully maintain that amended claim 1 distinguishes the invention over the prior art and particularly over the art relied on by the Examiner in rejecting the claims of the instant application. None of the references relied on by the Examiner, particularly Wilding et al., discloses or suggests such a sensing device having plural types of carrier beads made of different materials and having different kinds of biomolecules attached or bound to respective types of beads.

Amended claim 1 incorporates subject matter from original dependent claims 13 and 17. To the extent that the Examiner's rejection of claims 13 and 17 is applicable to amended claim 17, applicants traverse the Examiner's rejection of claims 13 and 17 and contend that amended claim 1 distinguishes over the prior art.

In rejecting original claims 13 and 17, the Examiner relies on the disclosure in the following paragraph (col. 11-12) of Wilding et al.:

The reaction of an analyte with a binding moiety in the binding region may be detected by means of an agglutination. A fluorescent or luminescent labelled molecule or bead capable of binding to the analyte or analyte/binding moiety complex in the binding region may be used to enable the binding of agglutination of the binding moiety and the analyte by light microscopy through a translucent cover over the binding region. For example, the agglutination of blood cells in a mesoscale binding chamber can serve as a positive test for the blood

type of the sample. Antibodies may be coated, either chemically or by absorption, on the surface of the binding region to induce agglutination, giving a positive test for blood type. The blood sample may be mixed with a fluorescent dye to label the blood cells and to enable the optical binding of the agglutination reaction. Antibodies bound to fluorescent beads also may be utilized. A plurality of binding regions housing different antibodies may be fabricated in the mesoscale flow paths to allow the simultaneous assay of e.g., A, B and Rh blood types in one device.

With reference to claims 12 and 17, the Examiner contends that the beads of Wilding et al. as discussed in this passage are different kinds of beads in that they are capable of binding to different antibodies. Applicants respectfully traverse the Examiner's interpretation of this passage in that there is nothing in this passage to suggest that the beads attached to one kind of biomolecule are in any way different from the beads attached to another kind of biomolecule. It is more likely that the different biomolecules are attached to respective groups of identical types of carrier beads in separate reactions. The beads are likely identical. The Wilding et al. reference provides no teaching or suggestion that would motivate one of ordinary skill in the art to use carrier beads made of different materials, as set forth in amended independent claim 1.

Pursuant to applicants' invention as set forth in amended claim 1, the different types of carrier beads are made of different materials and carry different kinds of biomolecules. This feature of applicants' invention enables the different kinds of biomolecules to be treated differently in the sensing device. For example, one type of bead may be made of magnetic material while another kind of biomolecule is made of a nonmagnetic material. The difference in the bead materials facilitates a magnetic separation of the one kind of biomolecule from another kind of biomolecule. The different kinds of biomolecules, attached to different types of beads, can be shunted to different areas of the sensing device, thereby facilitating detecting and measurement processes.

Claim 52 Claim 52 is identical to original claim 1. Applicants respectfully traverse the rejection of independent claim 1 as being anticipated by Wilding et al. Wilding et al. neither discloses nor suggests a collection of biomolecule-carrying beads in a vessel that form interstitial spaces in the vessel. The Wilding et al. reference says nothing about interstitial spaces. Applicants generate interstitial spaces throughout the vessel to facilitate, expedite, concentrate and enhance analyte attraction and detection.

Claim 53 New independent claim 53 is equivalent to original claim 14 rewritten in independent form to include all of the limitations of the base claim (claim 1) and any intervening claim (claim 13). Applicants respectfully traverse the Examiner's rejection of claim 14 and maintain that new claim 53 distinguishes over the prior art, particularly Wilding et al.

The Examiner relies on the above-quoted passage from Wilding et al. in rejecting the subject matter of new claim 53. However, Wilding says nothing about using different fluorescent tags on different biomolecules. Instead, the different biomolecules are detected by their different positions in different binding regions or mesoscale flow paths.

The claim amendments, if any, made herein are made without prejudice to applicants' right to pursue additional subject matter in a separate continuation or divisional application.

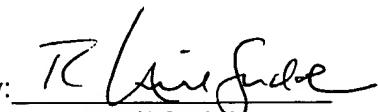
Conclusion

For the foregoing reasons, independent claims 1, 52, and 53, as well as the claims dependent therefrom, are deemed to be in condition for allowance. An early Notice to that effect is earnestly solicited.

Should the Examiner believe that direct contact with applicant's attorney would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the number below.

Respectfully submitted,

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